Outline of the Proposed Research Work Entitled

''A STUDY OF URBAN GROWTH USING GIS AND REMOTE SENSING TECHNIQUES: A CASE STUDY OF AURANGABAD CITY''

Submitted to

Swami Ramanand Teerth Marathwada University, Nanded

For The Degree of Doctor of Philosophy

In

Geography

Under the Faculty of

Social Sciences

By

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August, 2016

1.1 INTRODUCTION:

Urbanization in India is neither unique nor exclusive but is similar to a world-wide phenomenon. Urbanization is the worldwide phenomena where all mega cities are rapidly developing due to various factors including population increases, industrialization and rural to urban migration. Urban growth is affected by human interference and natural phenomena such as agricultural demand and trade. Population growth and consumption Patterns, economic development and other factors. The urban areas in the developing world are under constant pressure of a growing population. Urbanization indicates population increase in urban areas, the growth of secondary and tertiary activities. Indian cities are experiencing an accelerated pace of growth since independence. Cities are now emerging ascenders of domestic and international investments in an era of economic changes, liberalization and globalization. The economic development of the region has been linked with the level of urban growth.

Urban geography to study of urban centers and geographical and environmental condition of the urban area. The urban spread means the urban settlements spread to the rural fringe, i.e., growth of built-up area separate the city limits. Urban geography is the most important branch of human geography it the study of evolution of urban and its function and development of surrounding of urban region. It is study to urban centers in situation of geographical factor. Urban growth is indicating to the urban population growth. It is the including population growth of urban area and increased of urban size. The urbanization is depending on the social and economic activities in society and development. Urban growth is the concern as the different process of land use changes of urban area. Urban growth is the defined the expansion of newly developed as the isolated areas separate from the other area. The process of urban growth is contributed by population growth and migration.

The process of urban growth is affected by population growth and migration. Urban land use growth occurs mostly by the removal of vegetation through human activities such as construction of housing estates, road construction, agriculture and livestock etc. These causes are influenced by population increase, government policy and economic development. Remote sensing and geographical information system (GIS) are very valuable and advantageous in providing current land use information. The main change of land use in these areas can be described as other type of land use converting into urban land. The present study highlights importance of remote sensing in the detection of urban land use changes for the time periods of

(1991, 2001 and 2011) using the satellite imagery. Remote sensing imagery is the most important data resources of geographical information system. Geographical information system is the most powerful tool for the data collection, data storage, retrieving, transformation and display spatial data from the real world. The remote sensing is capacity to given the accurate and current information to map making measure and display the deferent element of urban growth.

1.2 LITERTURE REVIEW:

Population growth and economic development of region is the very intimately connected with the level of urban growth. Since the inception an important tool of land use study have been significantly combined geographical information system and remote sensing. Presently most of researcher study of urban growth in deferent area using the geographical information system and remote sensing techniques.

Bhagawat Trimal (2011). Urban growth and land use land cover change of pokhara sub-metropolitan city. He is done of this research work of population growth and land use classification identification of total six classes and infrastructure facilities in study area. Devyani Kohli (2006) spatio-temporal gradient modeling of urban land use land cover change. He is done of his research work of spatio- temporal analysis of urban environment and major changes of the study area. Prince C. Mmon and Florence W. fred Nwagwu (2013) Analysis of land use land cover change round the city port hercourt, Nigeria. He has to study the pattern and changes of the study area for the using satellite images 1986-2007 during period.

T.Al-Awadhi and L.K.A Azaz, Monitoring urban growth in Oman using the remote sensing and GIS seeb Wilayt case study. This researcher has using the satellite imageries and aerial photographs in study region. The satellite images have using the different period from 1991 to 2003. Jadab Chandra Halder (2013) Land use land use change detection mapping in Bilpur II block pachimm Medinipur District west Bengol : A Remote sensing and GIS perspective, the land use distribution of the deferent category and the change from 1970-2011. The spatial distribution of land use changes by the multi temporal analysis. R.K.Mehta (2011) Land use Land cover change detection using the RS and GIS Tools: Case study of Delhi state. Mr. S. U. Deore (2014) Land use land covers analysis using the remote sensing data: case study

of Nashik City. He was the study of investigation to effect of urban in agricultural field and searching to the causes and effect of social and economic condition of the study area.

Robert Cervero (2003) Road Expansion urban growth and induces travels. He has to study the effect of travel and road development directly effect on the urban growth. H.S. Sudhira, T.V.Ramchandra Urban growth analysis using spatial and temporal data. Author carried by the spatial and temporal technology by the RS, GIS and GPS. Atalel getu sahalu (2014) Analysis of the LULC changes: a case study of Ethiopia. The urban inter nation using the image classification and importance of urban modeling. Orisakwe K.U (2013) Change detection analysis of land use of Jigava state Nigeria. To study of the determination of the land use changes of the time period of 1978-2009.

Daniel and Ayobmi (2007) have concluded in particular land use land cover change in tropical region are major concern due to the widespread and rapidly changes of land use. Zahoor (2011) has stated that the urbanization is the one of most striking human induced conversion of the present period. The most of the cities are faster growing in the size and relation importance in many part of the world due to the rapid growth of urban population. Mohan (2005) has studies urban land and land use changes are dynamic in the nature and have to be monitor at regular interval for sustainable development, the digital data in from satellite imageries there for enable to the accuracy computer by the various land use land cover changing.Ramchandra and Kumar (2004), has study to the land cover refer to the physical characteristics of the earth surface, captured in the distribution of vegetation, water, soil and other physical feature of the land, including those created solely by human activities, land refer to the way of in which land has been used by human activities and their habitant, usually with on the function role of land for economically activities.

1.3 STUDY AREA:

Geographical location of the Aurangabad Municipal Corporation between 19º 53’59’’ north latitude and 75º 22’46’’ East longitude. The Aurangabad city has situated from mean sea level of 581Mts. It is a district and divisional headquarter located on the Kham river. The city of Aurangabad situated on the Deccan trap stand by the Dudhna valley between the Lakhwara ranges of the northern side and satara hills are located in southern part of the city. Aurangabad municipal corporation was ‘’A’’ class municipal council it’s having area about 54.4 Sq. Km in 1982. Then municipal council converts into Municipal Corporation in 1982 Additional 18 villages including corporation. It is having area of the 138.50 Sq. Km. its total population is 609206 male and female 565910 as per 2011 census. City has been divided by the 99 general election ward according to 2011.

The Aurangabad city has been situated on the Manmad-Hydrabad broad gauge railway line. This city is well connected by the district headquarters of Maharashtra state and major cities. Aurangabad city is good connectivity by airways and Road network. Aurangabad connects New Delhi capital of India by airline and railway.

1.4 AIM AND OBJECTIVE:

The aim of research is to study of the urban growth of the Aurangabad city use the remote sensing and GIS techniques. Following are some objectives have been used during the research.

1. To find out pattern of urban sprawl and housing structure of Aurangabad city.
2. To analyze the land use land cover change and land transformation in Aurangabad city using satellite images.
3. To Study of Slums of Aurangabad city.
4. To analyze the functional structure including GIS based Transportation Network and Health care facility analysis in Aurangabad city.
5. To study of industrial growth and its effect on urban growth of Aurangabad city.
6. To examine status in different urban problems in Aurangabad city
7. To examine of future planning for development and Suggest smart city role model using GIS technology for Aurangabad city.

1.5 DATA COLLECTION:

Present study will carry out with the help of primary data and secondary data.

1.5.1 PRIMARY DATA:

1. Field work.
2. Questionnaire.
3. GPS Survey
4. Landmark identification.

1.5.2 SECONDARY DATA:

The secondary data for the present study has been collected from the following source.

- District census handbook 1991, 2001 and 2011.
- City development Report 1995-2015, Aurangabad municipal corporation
- National Remote Sensing Center, Hyderabad.
- District town planning office Aurangabad.
- Various report of Aurangabad city.
- Socio- economic abstract.
- USGS Earth Explorer.
- Google Earth
- GLCF Website and Various newspaper and journals, Publish and unpublished thesis.

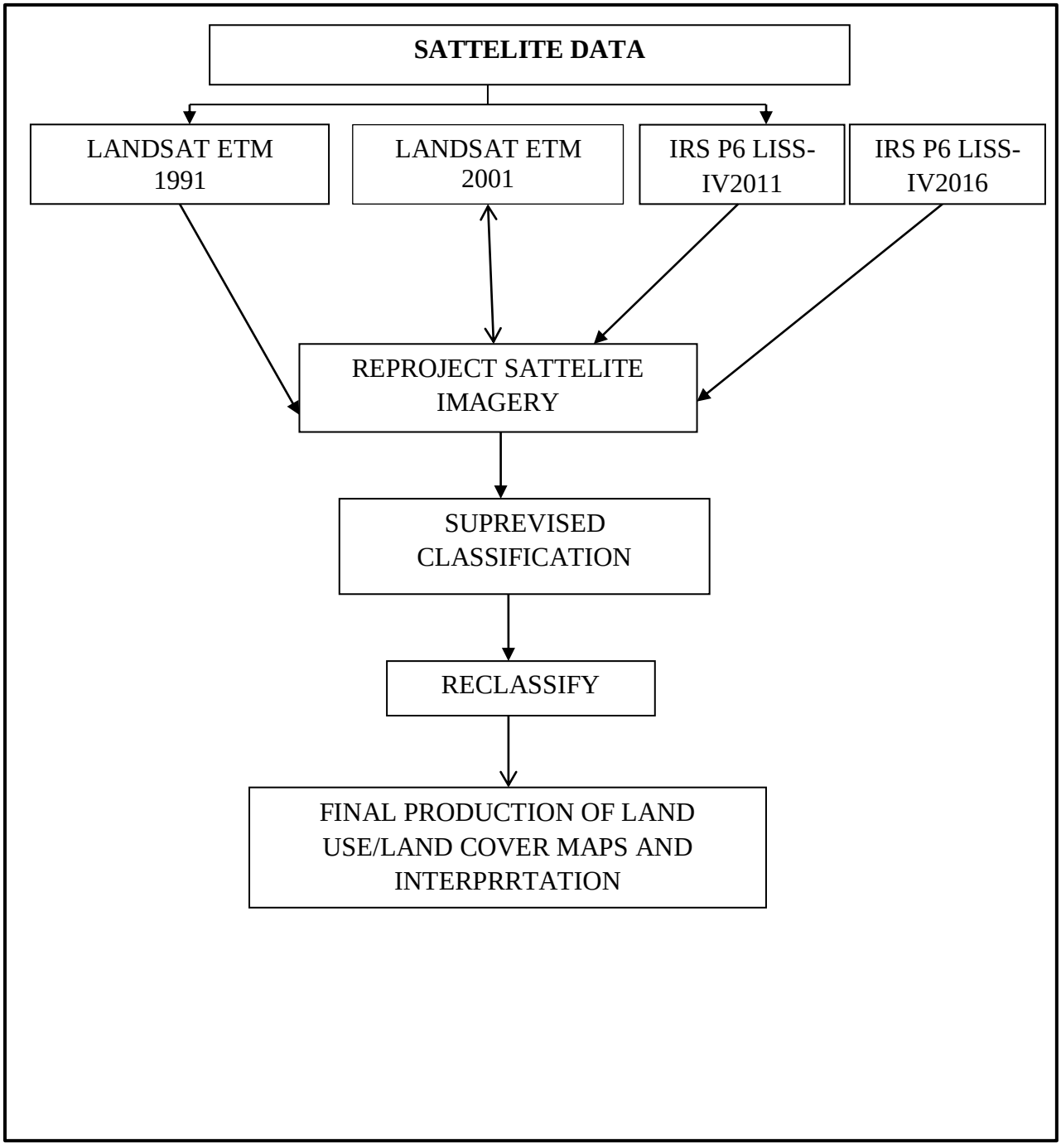
1.6 METHODILOGY:

Present study will carry out with the help of primary data and secondary data. Primary data will collect through field survey and questionnaire. The collected data has been processed and analyzed by using different quantitative, statistical technique and computer based software's. The analyze basic on the tables has been done as well as represent of graph, diagrams and maps. Population growth rate has been calculated by during a period of 1901 to 2011. Prepare the base map of survey of India SOI Toposheet no.47 E/7, 2001 and 2011 ward wise map of Municipal Corporation. Satellite imageries LANDSAT-5 TM (1991), LANDSAT-5 TM (2001) IRS P6 LISS4 (2011) and IRS P6 LISS4 (2016) data were using to map the urban growth for 1991 to 2011. Global Position System also uses to capture the major features identification in the corporation area. Present work has carried out with the help of computer based GIS software and Image processing software. GIS Software has been used visual interpretation and analysis of the satellite images.

Table.1 SATELLITE DATA

Sr. No	Data used	Resolution (Meter)	Data source
1	Landsat-5 TM WRS-2, Path 146, Row 046 Date.7 March 1991	30 MT	USGS Earth Explorer
2	Landsat-5 TM WRS-2, Path 146, Row 046 Date.1.April 2001	30 MT	USGS Earth Explorer
3	IRS-P6 LISS4-FMX Path-Row- 96-58 D Date.1 April 2011	5.8 MT	NRSC Hyderabad
4	IRS-P6 LISS4-FMX Path-Row- 96-58 D Date. March 2016	5.8 MT	NRSC Hyderabad
5	Toposheet no. 47 M/7	1.50000 Cm	Survey of India

FLOW CHART OF METHODOLOGY



1.7 IMPORATNTCE OF THE STUDY:

Urban geography is the most important branch of human geography it the study of evolution of urban and its function and development of surrounding of urban region. It is study to urban centers in situation of geographical factor. Urban growth is indicating to the urban population growth. Urbanization is the process by which villages converted into town and town has been developed into cities. It is a cyclical process through which a nation normally passes as it evolves from an agrarian to an industrial society. It is the including population growth of urban area and increased of urban size. The urbanization is depending on the social and economic activities in society and development. Urban growth is the concern as the different process of land use changes of urban area. The present study highlights importance of remote sensing in the urban land use change detection of Aurangabad municipal corporation limit. Remote sensing imagery is the most important data resources of geographical information system. Geographical information system is the most powerful tool for the data collection, data storage, retrieving, transformation and display spatial data from the real world. The remote sensing is capacity to given the accurate and current information to map making measure and display the different element of urban growth.

For the present study Aurangabad city has been selected because Aurangabad city is one of faster growing city of the Asia and it is the divisional and district headquarter of Marathwada region. Aurangabad city has become educational and tourist center of the Marathwada region. The city has come long way on the foundation provided by Industry, tourism and Educational wherein it has all the desired features and maturity to grow as a world class city. CIDCO was therefore established as special planning Authority and development of new Aurangabad. City became an educational centre for Marathwada region after establishment of Marathwada University in 1958, which later renamed as Dr. Babasaheb Ambedkar Marathwada University in 14 January 1994. Aurangabad is famous for the Industrial Zone there are four industrial areas in the city. i.e. i) Industrial area, Railway Station Road, ii) Chikalthana M.I.D.C. iii) Waluj M.I.D.C. iv) Shendra M.I.D.C. These industrial zone having the Automobile, liquor, chemical, electronic and agro base productions Considering all the features and aspects of the city, the topic and study area has been selected for the research.

1.8 PROPOSED WORK PLAN:

First year plan

1) Review of Literature:

   To approach this study, a review of published literature on relevant subject as well as unpublished material from different researchers and institutions specific to study area will be carried out.

2) Field work and Data collection:

   Data will be collected from various secondary sources and primary data will be collected with help of field work and other methods.

Second year plan:

Collected data related to our research will be analyzed and tabulated with the help of various statistical methods, and later on it will be presented with the help of cartographic and GIS techniques with help of software's.

Third year plan:

1) Interpretation of data:

   Data will be interpreted in this year.

2) Writing and submission of thesis:

   The thesis will be written after the interpretation of data and achievement of objectives and will be submitted at the end of third year

1.9 CHAPTER OUTLINE:

The present study titled of "A study of urban growth using GIS and Remote sensing techniques: A case study of Aurangabad city''. The present research work has been divided by the fifth chapters.

Chapter I deal with the appraisal of problems. This chapter given the detailed information about urban growth, introduction of urban, literature review, study area, objectives, data collection and methodology is present research work.

Chapter II is geographical setting of study area deal with the physical position of study area including the physiography, drainage system, and annual rainfall, and temperature, economic status of study area, transportation network and tourism of the study area.

C**hapter III** is deal with the urban sprawl, Demographic and housing structure. The decadal population growth analysis, ward wise population distribution, ward wise population density and ward wise household growth and distribution and density of study area.

Chapter IV deals with the land use land cover change and land transformation, analysis of urban land use changes, agricultural land use, commercial, barren, water bodies and settlement land use.

Chapter V deals with functional structure, Road network analysis and healthcare facility in Aurangabad city.

Chapter VI will devote to industrial development and urban problems.

Chapter VII deals with Future planning for development and Suggest smart city role model using GIS technology for Aurangabad city.

Chapter VIII which will the concluding chapter contains the summary and conclusions, which includes findings, suggestion

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